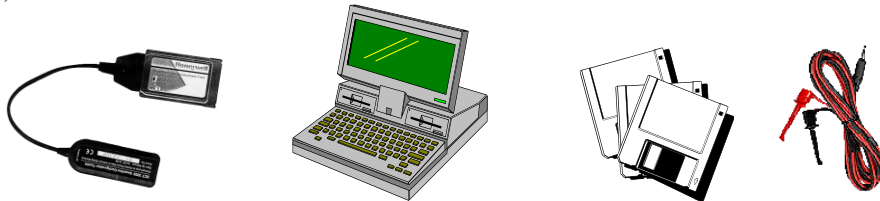




Demonstrating the SMV 3000 as a Flow Transmitter with the SCT 3000 - Smart Configuration Toolkit

1. You will need a [SMV 3000 transmitter](#) (Procedure assumes you are using a SMA125 with software version 4.0) with SMV 3000 User's Manual 34-SM-25-02 (12/98), SCT 3000 Software (Version 4.xx) and Hardware (LIM and PCMCIA card version A3) and connector wires. The software must be pre-loaded on a computer that has an available PCMCIA slot. See the SCT 3000 Start-Up & Installation Manual - 34-ST-10-08C (12/98). A power supply is needed - 24Vdc and 250 ohm resistor for communication. (The Smartline Demo Kit can be used to provide the power). Also, purchasing a 4 wire, 100 ohm RTD will also make the SMV demonstration more worthwhile.



2. The following assumes that the SCT 3000 software and hardware have been installed according to the Start-Up & Installation Manual. With power to the SMV 3000 and the SCT 3000 connections in their proper place, double click on the SCT software icon to open the software. The SCT 3000 Banner Window opens. Enter your name and click on OK. The main SCT 3000 Window opens. If the software and hardware are operating correctly, CARD OK appears in the lower-right corner of the screen. Now, to Upload a SMV 3000 transmitter database, select the proper toolbar icon (transmitter with red arrow going to computer). It will take a minute or so to upload the entire SMV 3000 database. You are now on-line with the connected SMV 3000.
3. The following describes each SMV 3000 Tab:

Device Tab -	Shows Tag I.D. #, Firmware Version, Transmitter Serial # and Scratchpad.
General Tab -	Shows PV type, Analog or DE, Configure Analog Output and Failsafe direction.
DPConf Tab -	Allows DP range configuration and Engineering Units selection.
APConf Tab -	Allows AP or GP range configuration and Engineering Units selection.
TempConf Tab -	Allows Temperature range, sensor type configuration and Eng. Units selection.
FlowConf Tab -	Allows Flow range configuration.
Status Tab -	Shows diagnostic status of the transmitter.

The following Tabs can be accessed via the View menu. Choose View, Options, General, Customize Options and then click on Enable Calibration. You must be On-line to see these tabs.

- | | |
|-------------------------|---|
| DP InCal Tab - | Allows Set, Correct, Reset Correct and Input Mode for PV1 (DP). |
| AP InCal Tab - | Allows Set, Correct, Reset Correct and Input Mode for PV2 (AP or GP). |
| Temp InCal Tab - | Allows Set, Correct, Reset Correct and Input Mode for PV3 (Temp). |
| Flow InCal Tab - | Allows Set, Correct, Reset Correct and Input Mode for PV4 (Flow). |

DP OutCal Tab - Allows you to place PV1(DP) into Output Mode (check the analog loop).
AP OutCal Tab - Allows you to place PV2 (AP) into Output Mode (check the analog loop).
Temp OutCal Tab - Allows you to place PV3 (Temp) into Output Mode (check analog loop).
Flow OutCal Tab - Allows you to place PV4 (Flow) into Output Mode (check analog loop).

4. Let's now look at several features of the SCT 3000 configuration software. Typical features to demonstrate while using the SMV 3000 include:
 - (a.) Configuring the differential pressure (PV1 = DP) range for 0 to 200 inches H₂O,
 - (b.) Configuring the static pressure (PV2 = AP or GP) range for 0 - 500 psia,
 - (c.) Configuring the process temperature (PV3 = Temperature) range for 0 - 700°F
 - (d.) Set the damping characteristics PV3,
 - (e.) Change the displayed engineering units for PV2,
 - (f.) Monitor all process variables
 - (g.) Look at the Input value for a PV.
- a. **Setting the DP range:** Click on the **DPConf** Tab. If the LRV box does not read zero, highlight the LRV box and enter 0. To set the URV to 200, highlight the URV box and enter 200. Now, click on the OK button. You can also select your Engineering Units here. Click on the arrow, pulling down the Engineering Units menu, and select the inH₂O @ 39F. Click on OK. (You can also change units by placing the cursor inside in the LRV or URV box and clicking the right mouse.) You have now set your DP range (PV1) for 0 - 200 inH₂O @ 39F.
- b. **Setting the Static Pressure range:** Click on the **APConf** Tab. If the LRV box does not read zero, highlight the LRV box and enter 0. To set the URV to 500, highlight the URV box and enter 500. Now, click on the OK button. You can also select your Engineering Units here. Click on the arrow, pulling down the Engineering Units menu, and select PSI. Click on OK. You have now set your AP range (PV2) for 0 - 500 psi.
- c. **Setting the Temperature range:** Click on the **TempConf** Tab. If the LRV box does not read zero, highlight the LRV box and enter 0. To set the URV to 700, highlight the URV box and enter 700. Now, click on the OK button. You can also select your Engineering Units here. Click on the arrow, pulling down the Engineering Units menu, and select the DEG. F. Click on OK. You have now set your Temperature range (PV3) for 0 - 700°F. The **TempConf** Tab is also where you select which temperature sensor (RTD, Type "J" TC, Type "E" TC etc.) will be connected to the SMV 3000.
- d. **Setting the Damping for PV3:** Damping is also set in the Configuration windows. Therefore, to set the damping for flow, click on **TempConf** Tab. Enter the required damping value and click on OK. Use the other tabs, **DPConf**, **APConf** to set the other damping values if needed. The damping for PV4 is set in the Wizard.
- e. **Changing the Engineering Units for PV2:** Use the **APConf** Tab to change the pressure units. Use the other Configuration Tabs to change the other PV Engineering Units.
- f. **PV Monitor:** Process Variable Monitor. Select View in the main menu and choose PV Monitor. The PV Monitor allows you to view all process variables for the SMV 3000. You can view the value in the engineering units that have been selected or as a % of range output. **You can also check (the loop) your 4-20 mA.** You must enable the Calibration Tabs to view them. Choose View, Options, General, Customize Options and then click on Enable Calibration. Click on **DP OutCal** Tab, highlight the Set Output box and enter a known output such as 0 or 50 and then click on the Set Output To button. The digital display in the demo case should read 4 mA in the case of 0% output and 12 mA in the case of 50% output.

- g. **Input Mode:** You can simulate the process measurements by entering a known input. This can be valuable when demonstrating the mass flow output. Click on **DP InCal** Tab. Highlight the Input Mode box and enter a value, such as 100 inches H₂O. Now, click on Write Input. This by-passes the sensor and simulates the written input. You can monitor this simulated value by using the PV Monitor.

Demonstrating the SMV 3000 for Liquid flow through an Orifice using a Dynamic Equation!

Flow Example 1 - Your customer wants to measure liquid Butane through an Orifice with Flange Taps. He has chosen to buy the Honeywell SMV 3000. You have already sized a concentric square-edged orifice for this differential pressure - flow application and provided the Orifice Sizing Data Sheet with the following information below. You will find another example of measuring liquid flow through an orifice in the SMV 3000 User's Manual.

Tag I.D.	FT-8171
Maximum Flow =	120 Base GPM or 573.33 lbs/m
Normal Flow =	95 Base GPM or 453.89 lbs/m
Flowing Temperature =	100°F
Flowing Pressure =	132.7 psia
Maximum Differential =	100.0 Inches H ₂ O (60°F)
Normal Differential =	62.67 Inches H ₂ O (60°F)
Operating Viscosity =	0.1450 cP
Reynolds Number (normal) =	386,649
Base Specific Gravity =	0.57307
Flowing Spec. Gravity =	0.54693
Base Temperature =	60 °F
Barometric Pressure =	14.7 psia
Pipe Diameter (D) =	3.0680 Inches
Bore (d) =	1.6137 Inches
Plate Material =	304 SS
Pipe Material =	CS

- Configuring PV1, PV2 and PV3 ranges** - Go to **DPConf** Tab and configure PV1 (DP) for 0 - 100 inches H₂O (60°F). Make sure your engineering units are inches H₂O (60°F). Go to **APConf** Tab and configure PV2 (AP) for 0 - 200 psia. Go to **TempConf** and configure PV3 (Temp.) for RTD at 0 - 150°F.
- Flow Configuration via Wizard** – Click on **Wizard** to start flow configuration. From Equation Model List page, choose Dynamic Corrections. Click Next. From **Flow Element Properties** page, choose Orifice with Flange Taps –D > 2.3 inches. Enter Bore Diameter of 1.6137 inches. Select 304 SS as the Material. Then, enter 100 deg. F as the Flowing Temperature. Click on Next. From **Fluid State** page, choose liquid. Click Next. From **Liquid Flow** page, choose Standard Volume. Click Next. From **Fluid Page**, select N-Butane from the list. Click Next. From the **Pipe Properties** page, select 40S as the Pipe Schedule, select 3 inches as the Nominal Pipe Diameter and select carbon steel as the Material of the pipe. Click Next. From the **Discharge Coefficient** page, choose the Reynolds number limits for discharge coefficient calculation. Enter 10,000 for the low limit and 800,000 for the high limit. Click Next. From the **Viscosity Compensation** page, select the temperature limits for viscosity calculation. Enter 0 deg. F for the low limit and 120 deg. F for the high limit. Click Next. From the **Density Compensation** page, enter the temperature limits for the density calculation. Normally, these will be the same as the limits entered on the Viscosity Compensation page. Therefore, enter 0 deg. F for the low limit and 120 deg. F for the high limit. Press Next. From the **Density Variables** page, enter the Base or Standard Density. Right click in the density box and change the units to S.G. at 60 deg. F and then enter the value of 0.57307. Press Next. From the **Flowing Variables** page, select Process Temperature for Flow Failsafe Indication (if the RTD fails, PV4 will go to failsafe.) Set damping to 1 second. Click Next. From the Solutions Page, you can review your

entries, see a graph of Discharge Coefficient, Viscosity or Density, or Print of a copy of your entries. Click Finish to download the new changes to the SMV 3000. This may take a few minutes.

- c) **Configuration of Flow Units** – Select **FlowConf** tab to choose the proper units for this application. The customer has asked for GPM. Therefore, right click in the URV box and choose GPM. Then change the URL to 200 GPM and the URV to 150 GPM. Click OK.
- d) **Placing the transmitter in Input Mode to demonstrate Flowrate** - Use the Input Mode to simulate the transmitter's process variables (DP, AP or GP and Temp.). The transmitter can be placed into Input mode to show that the transmitter (as configured per the data sheet) will output the correct flowrate. First, if you have not enabled Calibration, click View, choose Options, General, and select Enable Calibration. Now, click on the **DP InCal** Tab. Highlight the Input Mode box and enter 100 inches H₂O (60 deg. F) which is the customer's maximum DP and click on the Write Input button. To verify the Input, click on Read Input and make sure it reads the 100 that you entered. (Remember, once you enter into the Input Mode, you will see the yellow light (traffic light in upper right corner of the Window) flashing, which signifies a non-critical status). Now, click on **APInCal** Tab, highlight the Input box and enter 132.7 psia - the customer's flowing pressure. Click on Write Input. To verify, click on Read Input. Next, click on the **Temp InCal** Tab, highlight the Input box and enter 100 deg. F - the customer's flowing temperature. Click on Write Input. To verify, click on Read Input. Now that you have entered PV1, PV2 and PV3 into Input Mode, go to the **PV Monitor** page to view the process inputs and the simulated mass flowrate. To view PV Monitor, you must choose any tab besides an Input or Output Tab. Therefore, choose Device Tab. Now, from the Main menu, select View and choose PV Monitor. For this application, the flow should read approximately 120 Base GPM. This means, at the maximum DP of 100 inches, the flowing pressure of 132.7 psia and the flowing temperature of 100°F, the transmitter will output the customer's maximum flowrate – 120 Base GPM. Now, check the transmitter to make sure it calculates the correct flowrate at normal differential pressure. Go back to **DP InCal** Tab and change the Input to the customer's normal DP = 62.67 inches. Go back to **PV Monitor** and the flowrate should read approximately 95 Base GPM - which is the customer's normal flowrate as stated above. You have now shown your customer that the SMV 3000 can measure the DP, AP and Temperature for this liquid flow application and calculate the correct flowrate. (note, you must exit the InCal tabs to access PV Monitor.)
- e) **Compensating for Temperature** - Now, what if you customer says “well that's great, but my real process temperature is never the same as the temperature that I used to size the primary element (orifice plate)”? Ask him what he thinks that temperature is. Maybe, the process really runs around 80°F. Show him what flowrate he will have if his temperature is 80°F. Go back to **DP InCal** and change the DP back to the maximum = 100 inches. Now, go to **Temp InCal** Tab and change the temperature to 80°F. Next, go back to **PV Monitor** and you will see that flowrate has increased to about 97.1 Base GPM This is what you would expect with a decrease in temperature. Decreasing temperature, increases the density of the butane liquid and therefore increases the base volume flowrate. Now, go to **Temp InCal** Tab and change the temperature to 120°F. Next, go back to **PV Monitor** Tab and you will see that flowrate has decreased to approximately 94.7 Base GPM. This is what you would expect with an increase in temperature. Increasing temperature, decreases the density of the butane and therefore decreases the base volumetric flowrate. Now, you have shown that the SMV 3000 will track the customer's application data and also compensate for fluctuations in process temperatures.

Demonstrating the SMV 3000 for Natural Gas flow through an Orifice using a Dynamic Equation!

Flow Example 2- Your customer wants to measure Natural Gas through an Orifice with Flange Taps. He has chosen to buy the Honeywell SMV 3000. You have already sized a concentric square-edged orifice for this differential pressure - flow application and provided the Orifice Sizing Data Sheet with the following information below.

Tag I.D.	FT-0410
Maximum Flow =	85,000 SCFH
Normal Flow =	68,000 SCFH
Flowing Temperature =	80 deg. F
Flowing Pressure =	34.696 psia
Maximum Differential =	40 inches H ₂ O (60°F)
Normal Differential =	25.6 inches H ₂ O (60°F)
Operating Viscosity =	0.0114 cP
Reynolds Number (normal) =	427,699
Base Density =	0.0458 lbs/ft ³
Flowing Density =	0.1044 lbs/ft ³
Base Temperature =	60 °F
Base Pressure =	14.7 psia
Pipe Diameter (D) =	4.026 inches
Bore (d) =	2.7844 inches
Plate Material =	304 SS
Pipe Material =	CS
Ratio of Specific Heats =	1.25

- a. **Configuring PV1, PV2 and PV3 ranges** - Go to **DPConf** Tab and configure PV1 (DP) for 0 - 50 inches H₂O (60°F). Make sure your engineering units are inches H₂O (60°F). Go to **APConf** Tab and configure PV2 (AP) for 0 - 50 psia. Go to **TempConf** and configure PV3 (Temp.) for RTD at 0 - 100°F.
- b. **Flow Configuration via Wizard** – Click on **Wizard** to start flow configuration. From Equation Model List page, choose Dynamic Corrections. Click Next. From **Flow Element Properties** page, choose Orifice with Flange Taps –D > 2.3 inches. Enter Bore Diameter of 2.7844 inches. Select 304 SS as the Material. Then, enter 80 deg. F as the Flowing Temperature. Click on Next. From **Fluid State** page, choose gas. Click Next. From the **Gas Flow** page, choose Standard Volume. Click Next. From **Fluid Page**, select Natural Gas from the list. Click Next. From the **Pipe Properties** page, select 40S as the Pipe Schedule, select 4 inches as the Nominal Pipe Diameter and select carbon steel as the Material of the pipe. Click Next. From the **Discharge Coefficient** page, choose the Reynolds number limits for discharge coefficient calculation. Enter 10,000 for the low limit and 800,000 for the high limit. Click Next. From the **Viscosity Compensation** page, select the temperature limits for viscosity calculation. Enter 0 deg. F for the low limit and 120 deg. F for the high limit. Click Next. From the **Density Variables** page, enter 1.25 for the Isentropic Exponent (Ratio of Specific Heats), enter 80 deg. F for the Design Temperature, enter 34.696 for the Design Pressure, enter 0.1044 lb/ft³ for the Design Density and enter 0.0458 lb/ft³ for the Standard Density. Click Next. From the **Flowing Variables** page, select Process Temperature for Flow Failsafe Indication (if the RTD fails, PV4 will go to failsafe.) Also, select Pressure for Flow Failsafe Indication (if pressure sensor fails, PV4 will go to failsafe). Set damping to 1 second. Click Next. From the **Solutions Page**, you can review your entries, see a graph of Discharge Coefficient, Viscosity or Density, or Print of a copy of your entries. Click Finish to download the new changes to the SMV 3000. This may take a few minutes.

- c. **Configuration of Flow Units** – Select **FlowConf** tab to choose the proper units for this application. The customer has asked for SCFH. Therefore, right click in the URV box and choose CFH. Then change the URL to 100,000 CFH and the URV to 85,000 CFH. (Note: CFH implies SCFH, because you have chosen Standard Volume above in the flow Wizard.) Click OK.
- d. **Placing the transmitter in Input Mode to demonstrate Flowrate** - Use the Input Mode to simulate the transmitter's process variables (DP, AP or GP and Temp.). The transmitter can be placed into Input mode to show that the transmitter (as configured per the data sheet) will output the correct flowrate. First, if you have not enabled Calibration, click View, choose Options, General, and select Enable Calibration. Now, click on the **DP InCal** Tab. Highlight the Input Mode box and enter 25.6 inches H₂O (60 deg. F) which is the customer's normal DP and click on the Write Input button. Now, click on **APInCal** Tab, highlight the Input box and enter 34.696 psia. If you are using a SMG170 with gauge measurement, enter 20 psig. Click on Write Input. Next, click on the **Temp InCal** Tab, highlight the Input box and enter 80 deg. F - the customer's flowing temperature. Click on Write Input. Now that you have entered PV1, PV2 and PV3 into Input Mode, go to the **PV Monitor** page to view the process inputs and the simulated mass flowrate. To view PV Monitor, you must choose any tab besides an Input or Output Tab. Therefore, choose Device Tab. Now, from the Main menu, select View and choose PV Monitor. For this application, the flow should read approximately 68,000 Standard CFH. This means, at the normal DP of 25.6 inches, the flowing pressure of 34.696 psia and the flowing temperature of 80°F, the transmitter will output the customer's normal flowrate – 68,000 Standard CFH. (The SMV's flowrate may not exactly match the flowrate as determined by the Orifice Sizing Software. Flow Equations may vary slightly.) Now, check the transmitter to make sure it calculates the correct flowrate at maximum differential pressure. Go back to **DP InCal** Tab and change the Input to the customer's normal DP = 40 inches. Go back to **PV Monitor** and the flowrate should read approximately 85,000 Standard CFH - which is the customer's maximum flowrate as stated above. You have now shown your customer that the SMV 3000 can measure the DP, AP or GP and Temperature for this natural gas flow application and calculate the correct flowrate. (note, you must exit the InCal tabs to access PV Monitor.)
- e. **Compensating for Pressure** - Now, what if you customer says “well that's great, but my real process pressure is never the same as the temperature that I used to size the primary element (orifice plate)”? Ask him what he thinks that pressure is. Maybe, the process really runs around 40 psia. Show him what flowrate he will have if his pressure increases to 40 psia. Go back to **DP InCal** and change the DP back to the normal DP = 25.6 inches. Now, go to **AP InCal** Tab and change the pressure to 40 psia. Next, go back to **PV Monitor** and you will see that flowrate has increased to about 73,000 Standard CFH. (An increase in approximately 5 psi has increased the flowrate about 5,000 Standard CFH or 7.4%. That is a 7.4% error if you are not using a multivariable transmitter to compensate for the change in pressure.) This is what you would expect with an increase in pressure. Increasing pressure will increase the density of the natural gas and therefore increases the standard volumetric flowrate. Now, go to **AP InCal** Tab and change the pressure to 30 psia. Next, go back to **PV Monitor** Tab and you will see that flowrate has decreased to approximately 63,100 Standard CFH. This is what you would expect with a decrease in pressure. A decrease in the pressure will decrease the density of the natural gas and therefore decreases the standard volumetric flowrate. Now, you have shown that the SMV 3000 will track the customer's application data and also compensate for fluctuations in process pressure.

Demonstrating the SMV 3000 for Steam flow through a Preso Ellipse Pitot Tube!

Flow Example 3 - Your customer wants to measure saturated steam through a Preso Ellipse Pitot Tube. He has chosen to buy the Honeywell SMV 3000. You have already sized a 1.25-inch diameter (AHZ1-1200) Hot Tap pitot tube for a 12 inch pipe and provided the Sizing Data Sheet with the following information below.

Tag I.D.	FT-Preso
Maximum Flow =	36,000 kg/hr
Normal Flow =	18,000 kg/hr
Flowing Temperature =	210 deg. C
Flowing Pressure =	3 bar gauge
Maximum Differential =	986.47 mm H ₂ O
Normal Differential =	245.39 mm H ₂ O
Reynolds Number (normal) =	1,271,371
Flowing Density =	1.829 kg/m ³
Pipe Diameter (D) =	12 inches
Probe diameter	1.25 inches
Pipe Material =	CS

- Configuring PV1, PV2 and PV3 ranges** - Go to DPConf Tab and configure PV1 (DP) for 0 - 1000 mm H₂O (4oC). Make sure your engineering units are mm H₂O (4oC). Go to APConf Tab and configure PV2 (AP) for 0 – 5 bar . Go to TempConf and configure PV3 (Temp.) for RTD at 0 - 250oC.
- Flow Configuration via Wizard** – Click on **Wizard** to start flow configuration. From Equation Model List page, choose Dynamic Corrections. Click Next. From **Flow Element Properties** page, choose Preso Ellipse 1.25 inch for 12 inch Pipe. Select 316 SS as the Material. Then, enter 210 deg. C as the Flowing Temperature. Click on Next. From **Fluid State** page, choose steam. Click Next. From the **Pipe Properties** page, select 40S as the Pipe Schedule, select 12 inches as the Nominal Pipe Diameter and select carbon steel as the Material of the pipe. Click Next. From the **Discharge Coefficient** page, choose the Reynolds number limits for discharge coefficient calculation. Enter 50,000 for the low limit and 2,600,000 for the high limit. Click Next. From the **Viscosity Compensation** page, select the temperature limits for viscosity calculation. Enter 100 deg. C for the low limit and 300 deg. F for the high limit. Click Next. From the **Flowing Variables** page, select Process Temperature for Flow Failsafe Indication (if the RTD fails, PV4 will go to failsafe.) Set damping to 1 second. Click Next. From the Solutions Page, you can review your entries, see a graph of Discharge Coefficient, Viscosity, or Print of a copy of your entries. Click Finish to download the new changes to the SMV 3000. This may take a few minutes.
- Configuration of Flow Units** – Select **FlowConf** tab to choose the proper units for this application. The customer has asked for kg/h. Therefore, right click in the URV box and choose kg/h. Then change the URL to 50,000 kg/h and the URV to 36,000 kg/h. Click OK.
- Placing the transmitter in Input Mode to demonstrate Flowrate** - Use the Input Mode to simulate the transmitter's process variables (DP, AP or GP and Temp.). The transmitter can be placed into Input mode to show that the transmitter (as configured per the data sheet) will output the correct flowrate. First, if you have not enabled Calibration, click View, choose Options, General, and select Enable Calibration. Now, click on the **DP InCal** Tab. Highlight the Input Mode box and enter 245.39 mm H₂O (4 deg. C) which is the customer's normal DP and click on the Write Input button. Now, click on **AP InCal** Tab, highlight the Input box and enter 4 bar absolute - the customer's flowing pressure. Click on Write Input. Next, click on the **Temp InCal** Tab, highlight the Input box and enter 210 deg. C - the customer's flowing temperature. Click on Write Input. Now that you have

entered PV1, PV2 and PV3 into Input Mode, go to the **PV Monitor** page to view the process inputs and the simulated mass flowrate. To view PV Monitor, you must choose any tab besides an Input or Output Tab. Therefore, choose Device Tab. Now, from the Main menu, select View and choose PV Monitor. For this application, the normal flow should read approximately 18,000 kg/h. This means, at the normal DP of 245.39 mm H₂O, the flowing pressure of 4 bar absolute and the flowing temperature of 210°C, the transmitter will output the customer's normal flowrate – 18,000 kg/h. (note, you must exit the InCal tabs to access PV Monitor.)

- e) **Compensating for Temperature** – OK, maybe the process really runs around 230°C. Show him what flowrate he will have if his temperature is 230°C. Go to **Temp InCal** Tab and change the temperature to 230°C. Next, go back to **PV Monitor** and you will see that flowrate has decreased to about 17,900 kg/h. This is what you would expect with an increase in temperature. An increase in temperature will decrease the density of the steam and therefore decrease the steam flowrate. Now, you have shown that the SMV 3000 will track the customer's application data and also compensate for fluctuations in process temperatures.

Demonstrating the SMV 3000 for Air flow through a Lo Loss Venturi!

Flow Example 4 - Your customer wants to measure air through a Lo Loss Venturi. He has chosen to buy the Honeywell SMV 3000. You have already sized a Lo Loss Venturi for a 3 inch pipe and provided the Sizing Data Sheet with the following information below.

Tag I.D.	FT-Loss
Maximum Flow =	900 Standard CFM
Normal Flow =	630 Standard CFM
Flowing Temperature =	100 deg. F
Flowing Pressure =	129.7 psia
Maximum Differential =	100 inches H ₂ O (60 deg. F)
Normal Differential =	49 inches H ₂ O (60 deg. F)
Reynolds Number (maximum) =	445,641
Standard Density =	0.0764 lbs/ft ³

- a. **Configuring PV1, PV2 and PV3 ranges** - Go to **DPConf** Tab and configure PV1 (DP) for 0 – 100 inches H₂O (60°F). Go to **APConf** Tab and configure PV2 (AP) for 0 – 150 psia . Go to **TempConf** and configure PV3 (Temp.) for RTD at 0 - 200°F.
- b. **Flow Configuration via Wizard** – Click on **Wizard** to start flow configuration. From Equation Model List page, choose Standard since a Low Loss Venturi for gas is not supported by the Dynamic Equations. Click Next. From **Fluid State** page, choose Gas. Click Next. From **Gas Flow** page, choose Standard Volume. Click Next. From the **Process Data** page, enter the Normal Flowrate = 630 CFM, enter the Design Pressure = 129.7 psia, enter the Design Temperature = 100 deg. F, enter the Normal Differential Pressure = 49 inches H₂O (60 deg. F) and enter the Standard Density = 0.0764 lbs/ft³. Select Full for Compensation Mode. Click Next. From the **Flowing Variables** page, select Process Temperature for Flow Failsafe Indication (if the RTD fails, PV4 will go to failsafe.) Set damping to 1 second. Click Next. From the **Solutions Page**, you can review your entries or Print a copy of your entries. Click Finish to download the new changes to the SMV 3000. This may take a few minutes.
- c. **Configuration of Flow Units** – Select **FlowConf** tab to choose the proper units for this application. The customer has asked for CFM. Therefore, right click in the URV box and choose CFM. Then change the URL to 1000 CFM and the URV to 900 CFM. Click OK.
- d. **Placing the transmitter in Input Mode to demonstrate Flowrate** - Use the Input Mode to simulate the transmitter's process variables (DP, AP or GP and Temp.). The transmitter can be placed into Input mode to show that the transmitter (as configured per the data sheet) will output the correct flowrate. First, if you have not enabled Calibration, click View, choose Options, General, and select Enable Calibration. Now, click on the **DP InCal** Tab. Highlight the Input Mode box and enter 49 inches H₂O, which is the customer's normal DP and click on the Write Input button. Now, click on **AP InCal** Tab, highlight the Input box and enter 129.7 psia, the customer's flowing pressure. Click on Write Input. Next, click on the **Temp InCal** Tab, highlight the Input box and enter 100 deg. F - the customer's flowing temperature. Click on Write Input. Now that you have entered PV1, PV2 and PV3 into Input Mode, go to the **PV Monitor** page to view the process inputs and the simulated mass flowrate. To view PV Monitor, you must choose any tab besides an Input or Output Tab. Therefore, choose Device Tab. Now, from the Main menu, select View and choose PV Monitor. For this application, the normal flow should read approximately 630 Standard CFM. This means, at the normal DP of 49 inches H₂O, the flowing pressure of 129.7 psia and the flowing temperature of 100°F, the transmitter will output the customer's normal flowrate – 630 Standard CFM. Now, go back to **DP InCal** and input the maximum DP = 100 inches H₂O. Go to **PV Monitor** and the flowrate should be 900 Standard CFM.

- e. **Compensating for Temperature** – OK, maybe the process really runs around 130 deg. F. Show him what flowrate he will have if his temperature is 130°F. Go to **Temp InCal** Tab and change the temperature to 130°F. Next, go back to **PV Monitor** and you will see that flowrate has decreased to about 877 Standard CFM. This is what you would expect with an increase in temperature. An increase in temperature will decrease the density of the air and therefore decrease the air flowrate. Now, you have shown that the SMV 3000 will track the customer's application data and also compensate for fluctuations in process temperatures.
- f. **Got Questions concerning this Demonstration Procedure?** - Call John Schnake, SMV 3000 Product Manager, at (602) 313-3659 or send an e-mail - john.schnake@honeywell.com.
- g. **Got Questions concerning Applications?** – Call Lawrence Vanell at 602-313-3755.